UPDATING MANAGEMENT TOOLS IN THE SPHERE OF MATERIAL AUDIT AT THE ROCKET-AND-SPACE ENTERPRISES

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Abstract

The article specifies classification of materials used at the rocket-and-space enterprises based on studying record-keeping system of materials; the research systematizes material verification methodology; it results in proposing material audit methodology at the space-and-rocket enterprises.

Keywords: materials, rocket-and-space enterprises, material classification of rocket-and-space enterprises, material verification, material audit of rocket-and-space enterprises.

Introduction

Russia is one of very few countries obtaining a unique rocket-and-space industry that is characterized with science-intensive manufacture processes, high-technology products; it also obtains high innovation capabilities. Rocket-and-space enterprises manufacture all nomenclature of rocket-and-space technology from the heavy rocket booster to small space vehicles. Manufacturing rocket-and-space technology implies a wide range of technology and material variety.

The process of supplying manufacture with materials, their using in manufacture and material retirement require a special approach in this occasion. This is connected with requirement to the quality of materials and products made of them. Purchasing materials for manufacture of rocket-and-space technology demands to follow law regulations to the public purchases; the regulations specify the purchase process and trading, preparing contract arrangements between a supplier and a customer, regulations to fulfill the duties of contract participants. Materials need to verify before transferring them to manufacture; after the transferring to manufacture, they have to be verified on material flow and their retirement.

Classifying and recording materials used at rocket and space industry

Based on studying the system of material accounting at the manufacture in general, and while manufacturing rocket-and-space technology in particular, the classification of materials used at the enterprises was specified (fig. 1).

According to the Russian Ministry of Industry and Energy, the order issued in August, 23, 2006 "The

Regulation to determine the composition of the cost to manufacture defense products supplied by the government defense contract" was introduced; it has to be used by all governmental customers – participants of the government defense contract regardless of ownership and departmental identity.

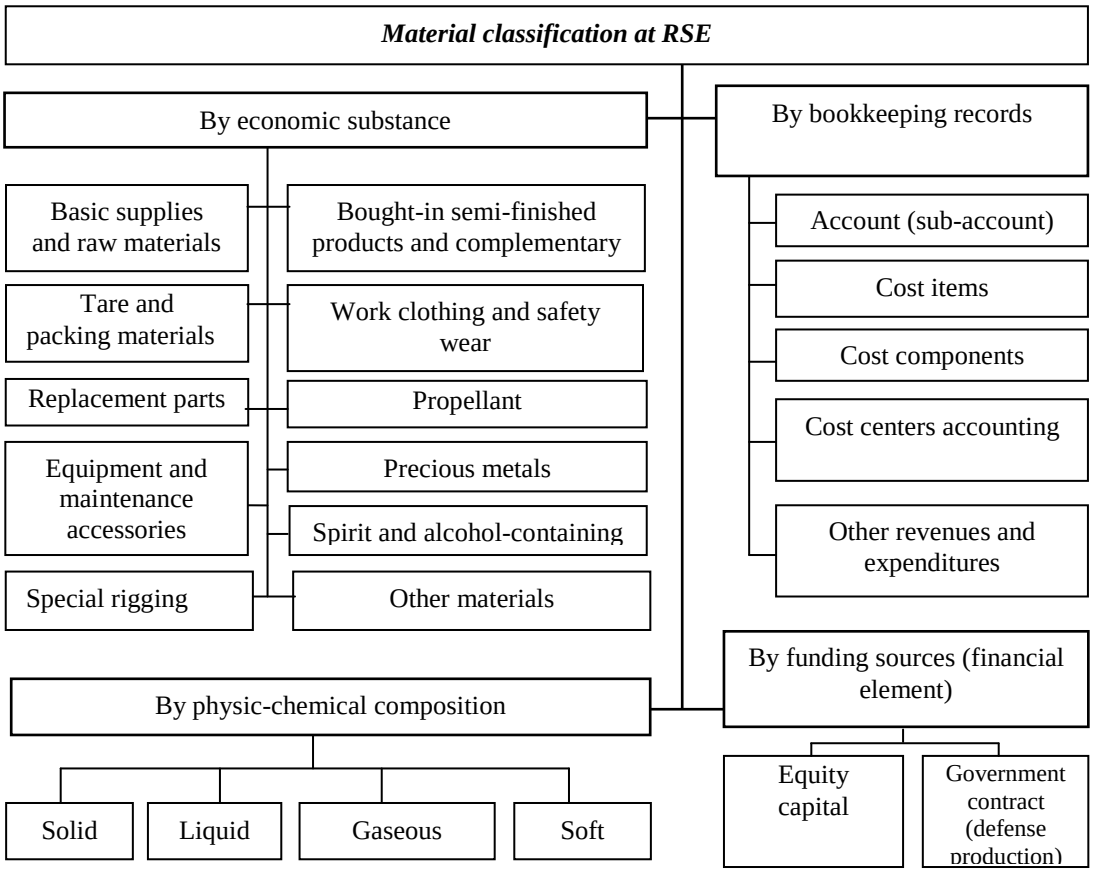

Fig. 1. Classification of materials at rocket and space enterprises

The document goal is an economically feasible estimation of cost necessary to manufacture and commercialize every product meeting the requirements to its quality.
Cost grouping due to costing items is performed depending on their designation and the places of their origin. The item “Expenditures to materials” reflects the cost for purchasing materials (after deducting reusable scraps) relating to product cost as direct cost at the established standards and regulations on material consumption and cost of their purchasing (tax free to the added value); the item consists of:

- raw materials and direct materials;
- auxiliary materials;
- purchased materials;
- reusable scraps;
- complementary articles;
- work and services of external companies of production nature;
- shipping and handling expenses;
- propellant for the engineering purposes;
- energy consumption at the engineering purposes;
- containers (expendable) and packages.

To analyse completely the material records in bookkeeping, it is viable to use the following groups while classifying the records: cost elements; the places of cost origin, and other costs and revenues.

Based on the proposed classification, we build up a scheme of material record sequence due to the activities of the rocket-and-space enterprises (fig. 2). The process presented in the figure is a framework to develop a sequence for material audit at the rocket-and-space enterprises.

Besides, the research identifies several main features of the material audit at the rocket-and-space enterprises:

1. Specific product procurement limits the purchased materials due to their quality.

2. Applying a variety of technology (including science-intensive) for manufacture requires purchasing a wide assortment of materials.

3. Materials used at manufacture are subjected to the strict incoming control and expiration dating period control.

4. Materials are purchased by tender with an obligatory contract to deliver materials.

5. Materials are purchased with not only at the enterprise's own expense, but at the expense of the state budget as well.

6. Materials are paid via special account.

We recommend considering the research on the grounds of the outlined features of the rocket-and-space enterprise activities and specific features of material record. Since the highlighted features identify the specific character of business and financial performance of these enterprises, they need to be reflected by the material audit methodology at the rocket-and-space enterprises.

Verifying materials used in the rocket-and-space industry

The rocket and space enterprises have got a list of materials subjected to the defense office control at the incoming stage and launch.

Verifying the purchased materials at the rocket-and-space organizations is performed via incoming material control.

The incoming control includes inspection department approval by:

- verifying accompanying documents;
- verifying visually;
- verifying completeness of sets;
- verifying parameters;
- verifying check samples;
- performing cycle inspection of adherence to specification and storing terms of products;
- following the regulations of product delivery and shipment of products.

According to their physical-chemical features, the materials used at the rocket-and-space enterprises can be solid, liquid, gaseous, and soft. However, irrespective to the material features, the enterprises have to receive, store and transfer them to the manufacture according to the incoming material control that guarantees usability of the materials for further application, as the activity of such enterprises is connected with the defense contracts. The incoming control scheme is presented by figure 3.

Verifying samples is performed by the research and development centre of material science. An auditor verifies the incoming material control results on the basis of the following documents:

- the incoming control demand;
- the physical-chemical analysis results.

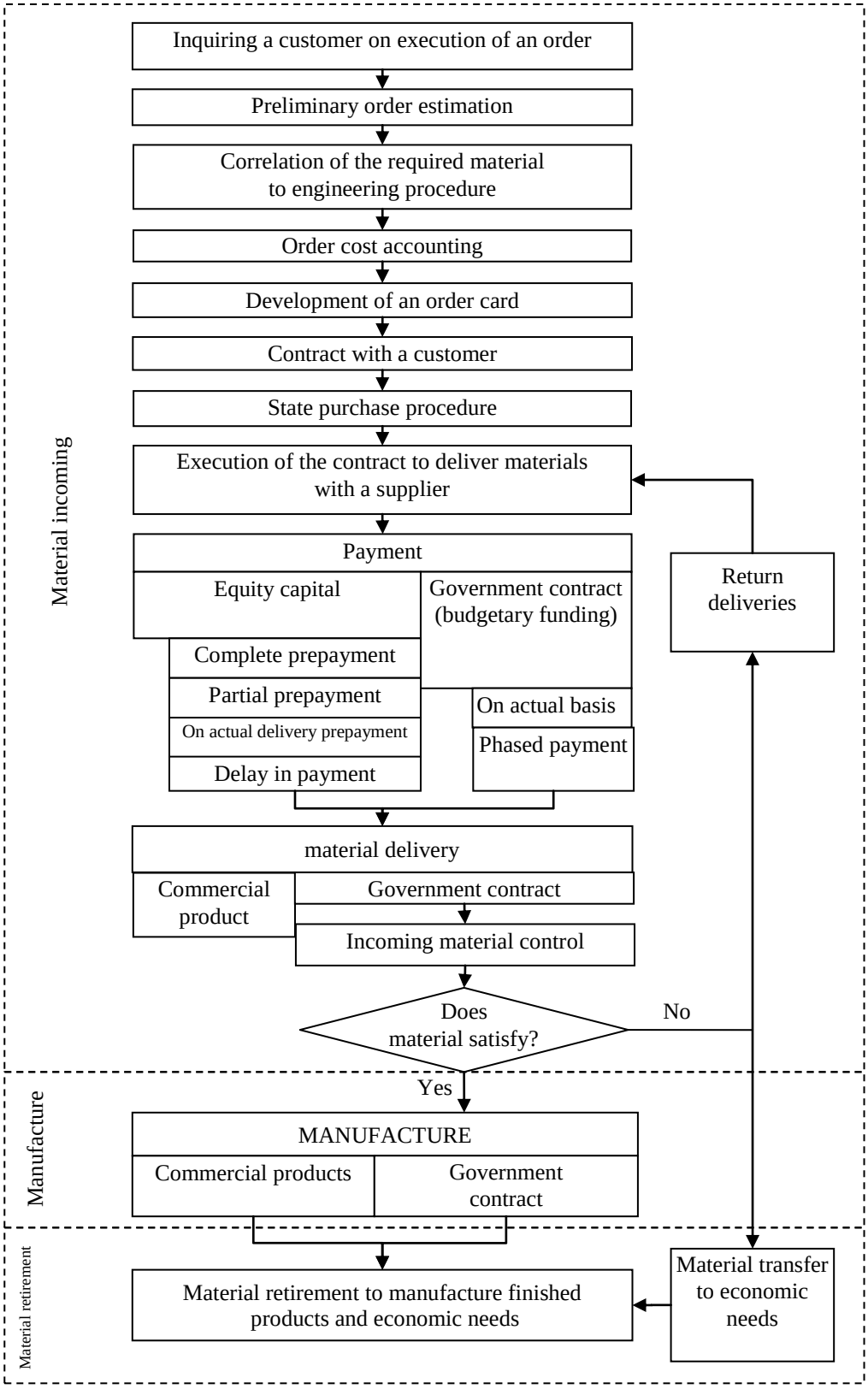

Fig. 2. Process of material incoming and record at rocket-and-space enterprises

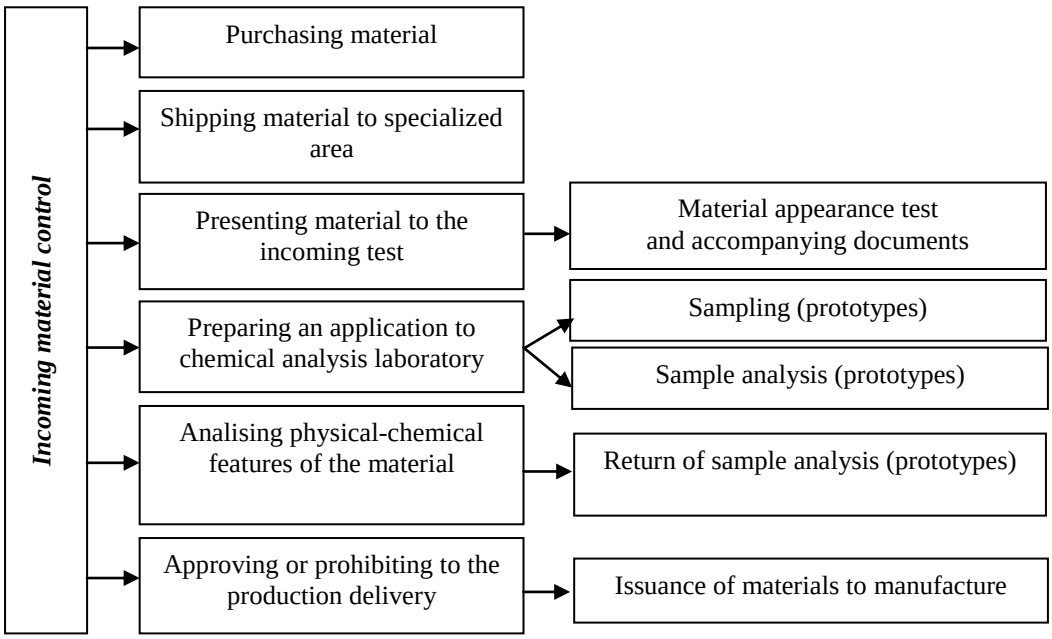

Fig. 3. Scheme of incoming control at the rocket-and-space enterprises

In case the inapplicability of materials due to their physical-chemical features is revealed, an enterprise has to file under an act of further material movement.

The incoming material control team decides if material should return to the supplier, or transfer to the stock to be used for economic needs. An auditor has to verify the following source documents:

- a memorandum to create an incoming material control team;
- a material exception report;
- a reclamation to a supplier.

The inspection allows verifying the results of physical-chemical feature analysis and substantiating its quality.

Material audit methodology at rocket-and-space enterprises

Efficiency of material audit is mainly determined by the activity: how a rocket-and-space enterprise organizes and plans its business and financial performance.

The analysis of material audit methodologies demonstrates that the existing methodologies do not take into account specific features of the activity and material records at the rocket-and-space enterprises.

In particular, there are no audit procedures reflecting the inspections:

- adherence of public purchase;
- material payment;
- incoming material control;
- specific character of products of defense and commercial value;
- required material with the engineering process;
- special account to pay for the material.

The rocket-and-space enterprise audit goal is to form an opinion about the consistency of the reporting to the material items and the relation to the audit methodology used at the enterprise.

The material verification at the rocket-and-space enterprises is considered to be the main part of inventory audit, as far as their amount is significant at manufacture.

The tasks for material audit at the rocket-and-space enterprise are:

- studying the state of accounting, storing, and efficiency in using materials;
- reporting the correlation of factual availability of materials due to accounting data and the enterprise demands;
- uncovering the materials unsuitable for use and determining the amount of the inflicted damage and liable persons;
- analyzing the completeness and promptness of recognition, validity and suitability of material utilization and disposal;
- verifying and following the established standards of consuming raw materials, materials, propellant and other values, promptness and inventory check quality and correctness of decisions made on audit findings;
- verifying compliance of the material public purchase conditions;
- verifying compliance material payment at the expense of enterprise equity capital or at the expense of the government contract funds;
- verifying the incoming material control via both visual and physical-chemical analysis;
- verifying the compatibility of the required material to the engineering process;
- verifying the specific product character of both commercial and defense designation;
- verifying the material payment terms via the special account.

Material accounting audit at the rocket-and-space enterprises necessarily starts with verifying records of requirements to the material accounting in the accounting policy.

Performing the procedure, an auditor needs to verify not only the sequence of the activities on the material income, transfer and disposal, but also the records at the bookkeeping accounts at the enterprise.

It is necessary to consider a material income accounting that has got special requirements to organize public purchase to provide public needs according to the legislative base.

Besides, the compulsory condition for material purchase to provide the government contract is its payment via a special account. The enterprise accounting policy should reflect the demands to purchase materials with using a special account.

Verifying operations on material incoming has to be performed with a goal to determine a necessary material purchase, its validity and relevancy. The verification needs to be performed according to the scheme of material incoming and accounting audit, presented by figure 4.

According to the scheme, an auditor should start the verification with studying a customer inquiry to manufacture a product or a service. A customer can be either entities and persons or representatives of the governmental agencies responsible for government procurement.

The government needs are Russian Federation or its entities' demands determined in the manner prescribed by the law and provided at the expense of budget and non-budget funding sources.

The regulations on delivery contract are provided by the Civil Code articles 525 – 534 of the Russian Federation; they determine relations within production delivery, services, performing work for the state needs.

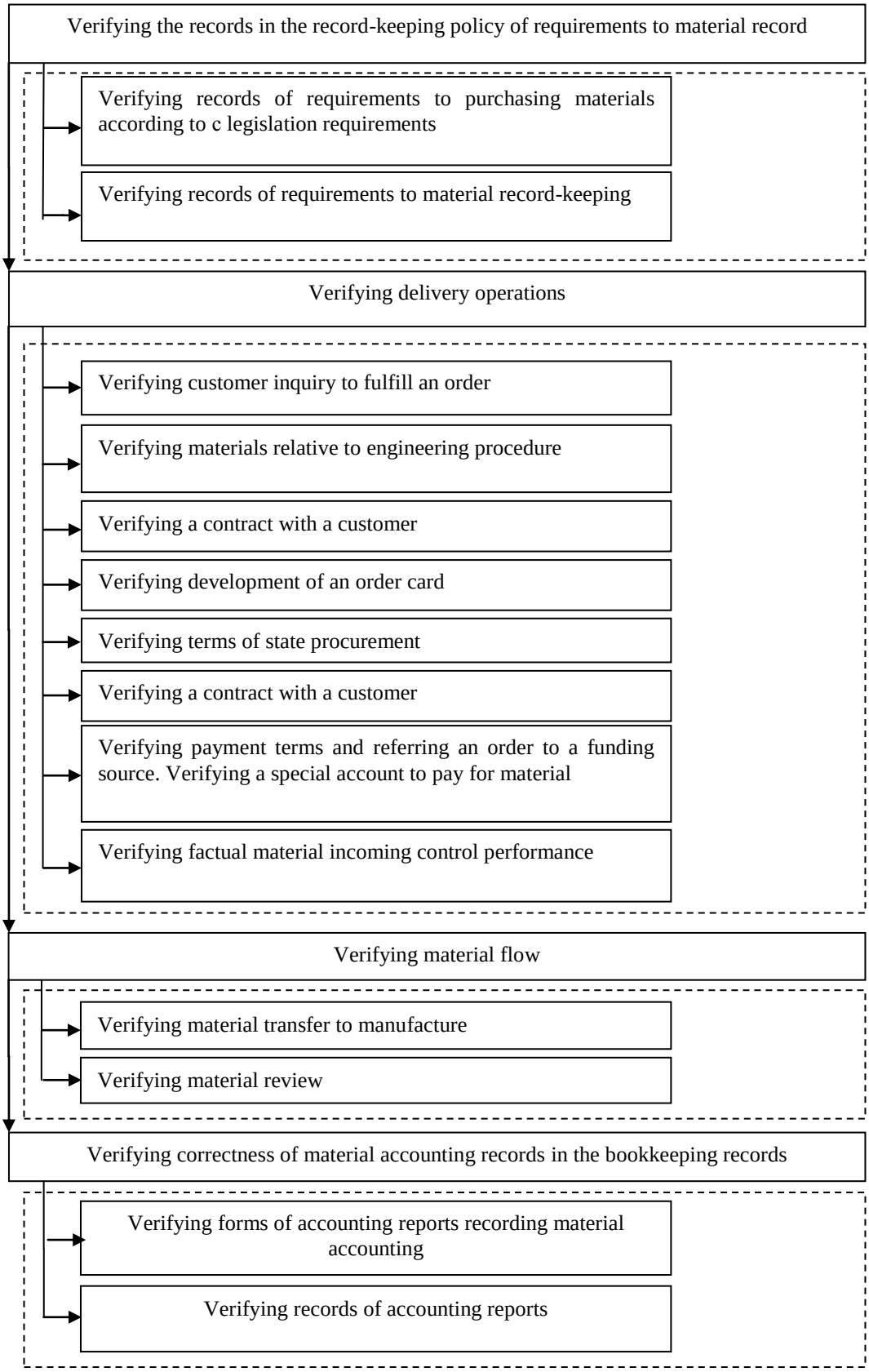

Fig. 4 Scheme of material audit at rocket-and-space enterprises

The next stage is to verify correlation of a customer inquiry and the required material according to the engineering process within the list of materials necessary to complete a contract.

An auditor needs to correlate the preliminary amount of materials to the engineering process requirements. Therefore, they need to realize if there has been any material substitution. The substitutions need to be agreed with a production engineer and a designer and to be written down in the manufacturing documents. The verification allows exposing correctness of the preliminary catalogue to purchase material and exclude overtrade.

Further, it is necessary to verify the existing contracts with customers. The contracts with customers are signed based on agreed terms of manufacturing products, services noted at the preliminary inquiry. If a preliminary inquiry does not meet the customer's requirement or a contractor one, the contract cannot be signed.

The government contract is signed on the basis of the government customer contract to deliver product to the public needs adopted by the supplier (contractor). State corporation "Roscosmos" and the Ministry of Defense can be public customers to the rocket-and-space enterprises.

Every government contract has got an identifier of the government contract before including its information to the contract catalogue according to the Russian Federation Law on the contract system in the sphere of purchasing goods, work, services to provide the public and municipal needs. The contract identifier presents the following information:

- identification code of the government customer;
- method to determine a supplier (contractor, contract holder);
- year to sign the government contract;
- year to complete validity period of the government contract;
- number of the government contract, labeled successively due to consecutive numbering per annum independently for every government customer.

Along with the government contracts, the rocket-and-space enterprises obtain contracts to manufacture commercial products. An auditor needs to analyse and distinguish the contracts. The verification allows not only inspecting the correctness in filling in contracts to the product for defense designation and to commercial products, but also analyzing the used materials to exclude their double accounting.

Based on the signed contracts, the production scheduling and financial department develops order cards. An auditor needs to verify the correctness of developing an order card and costing, where materials to fulfill a contract are included. The verification gives a possibility to verify the correctness of developing an order card and to control the correlation of material to a definite order.

On presenting the material list to fulfill a contract, it is necessary to check a material availability in stock. In this case, an auditor checks if there has been a request to the stock on the material quantitative availability. If a material is in stock, it is transferred to fulfillment of a contract. Such material is not purchased.

An auditor needs to pay attention to the stocks not to purchase materials, as their out-time usage results in losing the physical-chemical features of materials, that does not permit their further usage to manufacture products. This verification gives a possibility to check the availability of materials in stock, that reduces purchasing materials and results in decreasing the surplus stock as well as increasing an amount of circulate assets.

After checking the factual availability of the material in stock, an auditor compares data on the required material supply and stock balance.

Further, an auditor needs to verify the terms fulfillment for the government contract demands. Since the rocket-and-space enterprises belong to the state enterprises, referring to the laws of Russian Federation, they are obliged to purchase materials and other equities in accordance with law № 44 issued 05.04.2013 "On the contract system in the sphere of purchasing goods, work, and services to provide public and municipal needs". To fill in an application form to the government purchase, a request for quote is used. According to the request quote, it is necessary to verify the following criteria:

- material name;
- material characteristics
- material amount;
- price policy of commercial proposals;
- delivery terms.

Based on this verification, an auditor checks the correctness of material choice. During further audit procedure, an auditor verifies contracts with suppliers. While checking contracts, an auditor needs to examine who has to provide a delivery contract. As a material supplier, there should be a person won a contract in public purchase and included to the catalogue of suppliers to the public needs. Having won the public purchase contract to deliver materials, the supplier automatically agrees to use a special account; this condition should be written down in the request for quote. These procedures allow estimating the fulfillment of material purchase requirements by the rocket-and-space enterprises.

The next audit procedure is to verify material payment terms and relation of the payment to the source of financing. Materials are paid at the expense of the equity capital. The material delivery contract describes the terms of payment. They cover: total payment, partial payment, payment after material delivery, pre-payment, delay in payment or progress payments.

Fulfilling the government contract is performed at the expense of the equity capital of the rocket-and-space enterprises if the government customer compensates all lost revenues to the supplier while the contract is fulfilled. Currently, the compensation to the lost revenues to the enterprise is performed from the budget with a delay. Therefore, the audit procedure is necessary for the rocket-and-space enterprises and it allows tracing the timeous payment for the materials according to the contract as well as tracing if the revenues are paid from the budget for the materials spent on the public needs.

Next an auditor needs to verify an order of flowing material to the stock. The auditor has to inquire the following documents: invoices, bills, certificates of quality and others.

To check certificates, an auditor should check the absence of unauthenticated corrections and comment relating to any faults, as these documents guarantee the quality of the material. If there is nonconformity of the obtained materials to the certificate of quality, the material should be returned to the supplier, and the supplier decides either to change the material or to return its total value in respect to all expenditures.

The verification allows checking documents of incoming materials according to the delivery contracts, and it gives a chance to check the quality of the delivered material approved by the accompanying documents.

The incoming materials to the organization are visually checked. An auditor has to control if there has been material inconsistency during the visual check and if these facts are in the material delivery sheet and the register book. After discovering such facts, it is significant to trace further material flow, if the registered material is returned to the supplier and the accounting documents for the material are filled in.

An auditor checks the material transfer to the manufacture on the basis of analyzing conforming documents. Verifying the material disposal to the finished products can be traced with cost items,

input factors, and cost centres.

Verifying operation on the material flow has to start with checking material transfer to the manufacture. An auditor checks the analytics of the material transfer to the manufacture on the ground of the primary documents (Form M-11). This check gives a possibility to control the correctness of material correspondence due to commercial and defense product based on analytics of cost items, input factors, and cost centres.

Further procedure is to check material disposal. Material disposal is performed on the basis of certificate of disposal, regulation disposal and checking the board members responsible for material disposal. This allows checking the correctness of material disposal to the contract of commercial and defense designation.

To check the correctness of material record in the bookkeeping, an auditor has to verify accounts "Materials" based on the analytics, the accounts described in the accounting balance-sheet of the rocket-and-space enterprise and notes to it.

The proposed methodology allows not only verifying the correspondence of the material purchase procedure to the current legislation, but specifying deficiencies in the audit scheme of the material purchase procedure at the rocket-and-space enterprises.

Results

Using the proposed recommendations on audit performance of materials at the rocket-and-space enterprises will allow an auditor to evaluate:

- material income taking into account the control of a customer request relating it to the engineering process;
- payment terms for the materials taking into account legislation enforcement on performing public procurement for the public needs;
- releasing for manufacture and expensing materials due to the product types of commercial and defense purposes.

The developed methodology demonstrates the main features of enterprise activities at rocket-and-space industry and allows increasing efficiency of an enterprise integrated to the corporate structure of the industry.

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